Transforming U.S. Agriculture in the 21st Century

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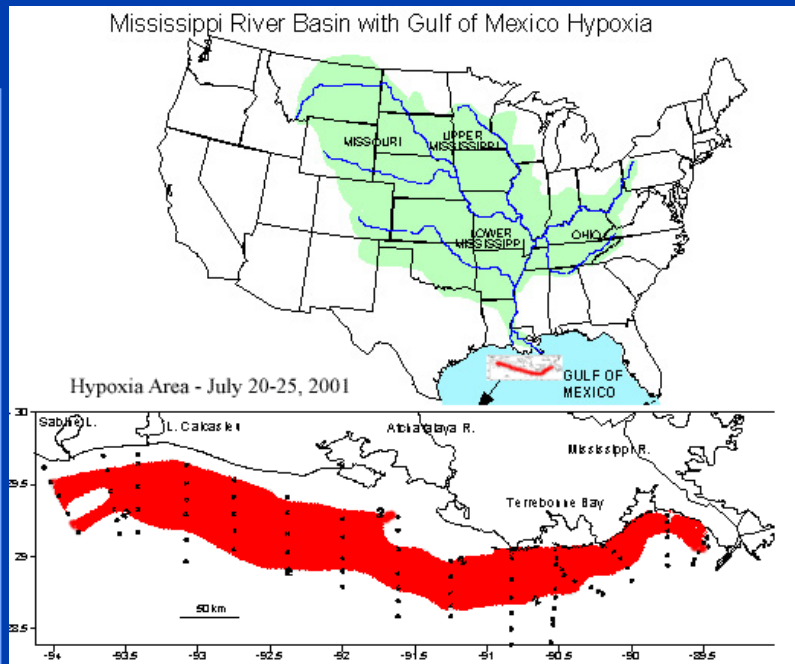
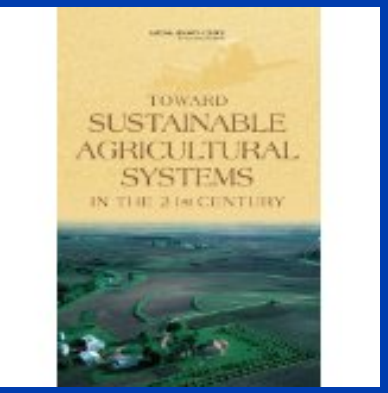
Why? Transformation is needed because we have many problems in agriculture as a result of not addressing multiple sustainability goals.

- Our concentration to dramatically increase yields in the past 60 years has had negative consequences on the other sustainability goals.
- Such consequences include overdrawn aquifers; eroded soils; and surface and ground waters contaminated with sediment, nutrients, and pesticides; prime farmland loss; and decline of well-being of rural communities

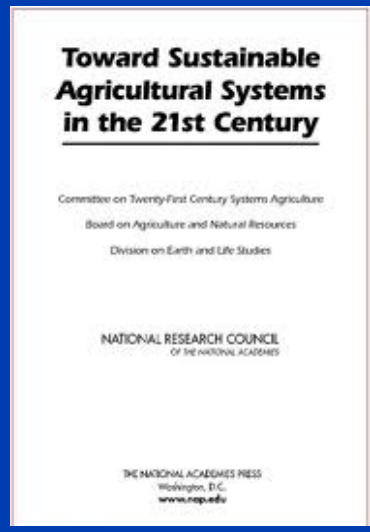


The Multiple Goals of Sustainable Agriculture



The 2010 NRC Report

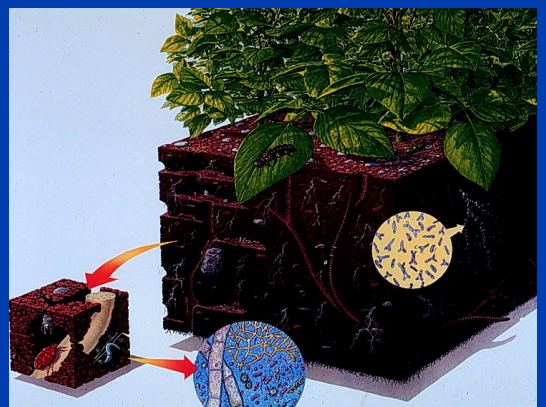
- **Provide abundant, affordable food, feed, fiber, and fuel;**
- **Enhance the natural-resource base and environment;**
- **Make farming financially viable;**
- **Contribute to the well-being of farmers, farm workers, and rural communities.**



Sustainable intensification is defined as increasing crop production per unit area and improving environmental, economic, and social sustainability via management of biodiversity and ecosystem services (FAO, *Investing in Sustainable Agricultural Intensification*, 2008).

The National Academy of Sciences NRC Report

- The NRC Report criticized mainstream, conventional farming for not addressing multiple sustainability goals.
- It identified numerous examples of innovative farming systems and practices that contribute to multiple sustainability goals but noted they are not widespread.
- To improve sustainability of U.S. agriculture, the Report proposes both incremental and transformative approaches.



Incremental Approaches

- **Incremental approaches are practices and technologies that address specific production or environmental concerns associated with mainstream, conventional farming systems.**
- **Examples include 2-year crop rotations, precision agriculture, classically bred or genetically engineered crops, and reduced or no tillage.**
- **Incremental approaches offer improvements and should continue, but individually are inadequate to address multiple sustainability concerns.**

Transformative Farming Systems

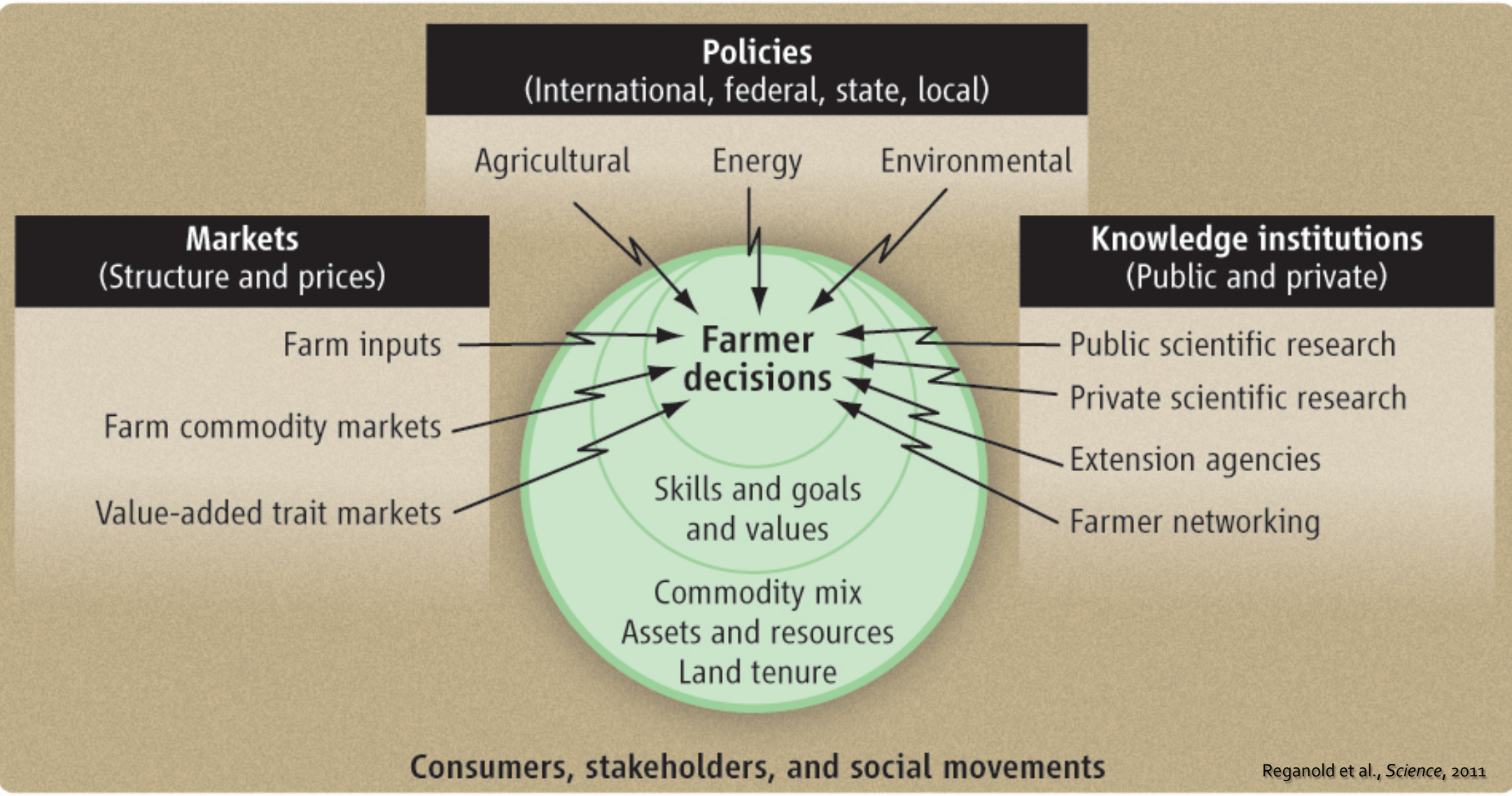
Such systems integrate production, environmental, and socioeconomic objectives and reflect greater awareness of ecosystem services on large, mid-size, and small farms.

- Conservation Agriculture
- Mixed Crop/Livestock
- Grass-Fed Livestock
- Organic
- Integrated (Hybrid)
- Perennial Grain

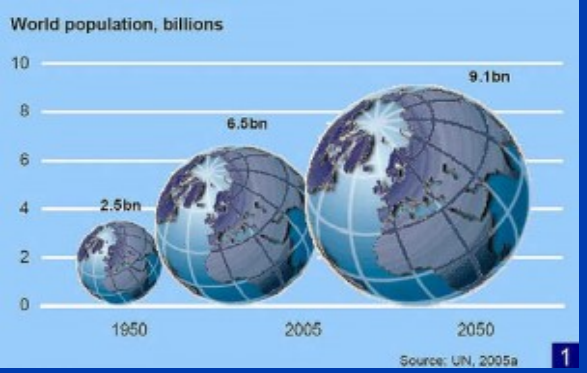
Coexistence of Different Farming Systems

- **No one farming system will safely feed the planet, but rather a blend of farming systems will be needed.**
- **In fact, proper alignment and coexistence of different farming systems at the landscape level will likely play a key role in future food and ecosystem security.**
- **The existence of innovative agricultural systems suggests that technical obstacles are not the greatest barrier.**
- **Rather, change is hindered by market structures, policy incentives, and uneven development and availability of scientific information that guide farmers' decisions.**

Drivers and Constraints Affecting Farmers' Decisions



Reganold et al., *Science*, 2011



Population, Consumers, Stakeholders, and Social Movements

- Population is growing and may hit 9 billion or more people by 2050.
- Consumers need to take responsibility for what they eat and how much they eat.
- The power of special interest groups and big money has changed the landscape.
- Food movement is growing; for example, more farmers' markets and CSAs.

USDA ORGANIC

Market Structures

- Most U.S. farmers sell products to a highly consolidated global agri-food industry rewarding primarily the provision of large volumes of low-cost food, feed, fiber, and fuel, often constrained by contract requirements of food processors and retailers.
- As markets become increasingly concentrated, the decisions that farmers can make about what to produce and where to sell are becoming limited.
- Farmers' knowledge and skills are lost as they specialize in fewer crops.
- At the same time, consumer demand is growing for more sustainability brand products.
- If these sustainability brand products can reflect multiple sustainability goals, why can't market forces be altered through public-policy incentives to support these products?

Policy Incentives

- Many international, federal, state, and local agricultural and environmental policies influence farmer decisions.
- A major policy driver for U.S. agriculture is the Farm Bill because it has a major influence on what, where, and how food is produced.
- Most elements of the Farm Bill were not designed to promote sustainability.

The Farm Bill

- Subsidies are commonly criticized for distorting market incentives and making our food system overly dependent on a few grain crops mainly used for animal feed and highly processed food, with deleterious effects on the environment and human health.
- Spending needs to be reduced on crop subsidies and be reallocated to increase support for farming systems that balance all four sustainability goals and to encourage markets for sustainability brand products.
- We do have the knowledge base to do this but it will not be easy.

Agricultural Science and Knowledge

- Most federal research grant programs still primarily support incremental research.
- The bulk of public and private agricultural science in the U.S. is narrowly focused on productivity and efficiency, particularly on technologies that fit into existing production systems and lead to private benefits.
- We need to reallocate public funds to support systems research that measures multiple sustainability indicators and explores farm productivity and resilience at field, farm, and landscape scales.

Systems Focus

The True Value of Science

- The benefits of science can sometimes be modest because solving societal problems is usually more difficult than generating new knowledge.
- Better information is rarely sufficient. Repeated studies have shown that making information useful demands engagement with those who will use it.
- Agricultural science can serve a broad range of users, including farmers and policymakers.
- In addition to advancing scientific knowledge, scientists need to inform decisions and communicate and educate so that scientific knowledge is more relevant to local, regional and national societal needs.

AGree <www.foodandagpolicy.org>

- AGree is a new initiative that brings together a diverse group of interests to transform U.S. food and agriculture policy so that we can meet the challenges of the future.
- AGree is focusing on finding innovative solutions that enhance access and availability of nutritious foods for a growing global population, protect the natural resources that sustain us, and ensure that farmers and rural communities succeed economically.
- AGree seeks to engage a variety of stakeholders in a dialogue that leads to positive and fair U.S. policy changes and solutions.

AGree
Transforming
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What kind of agriculture do we want?